

FIG. 1

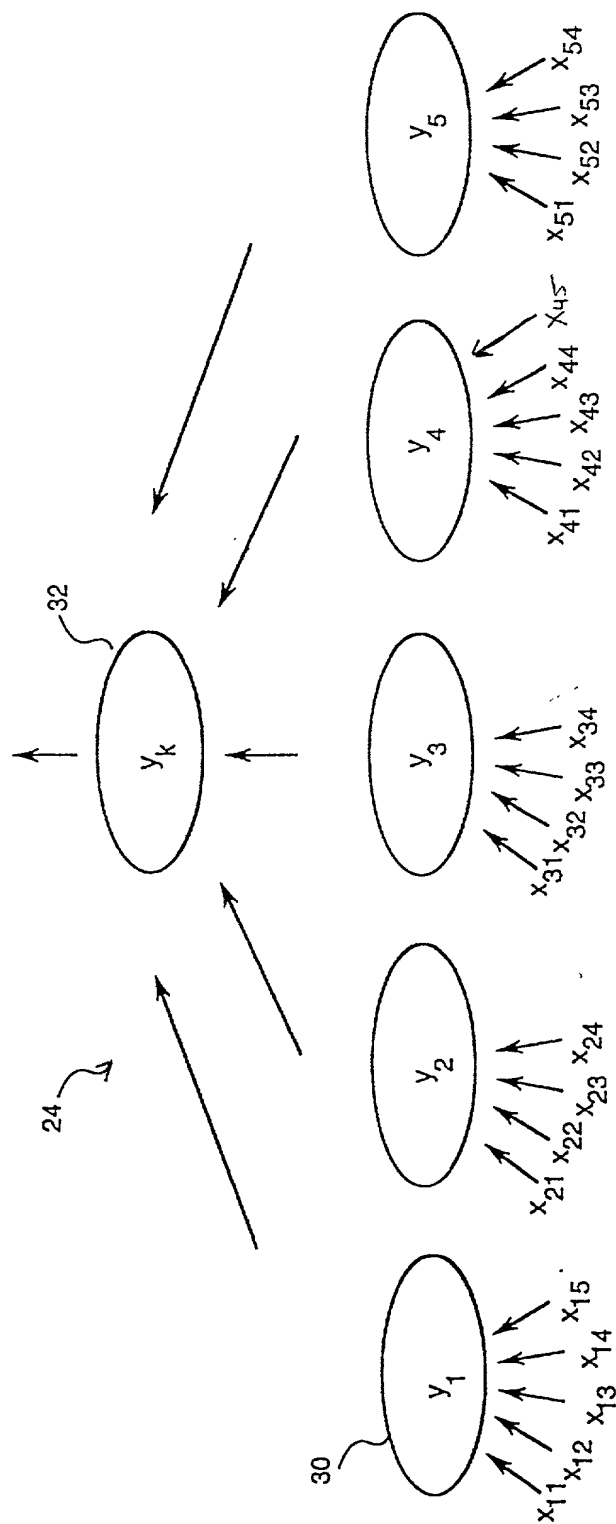


FIG. 2

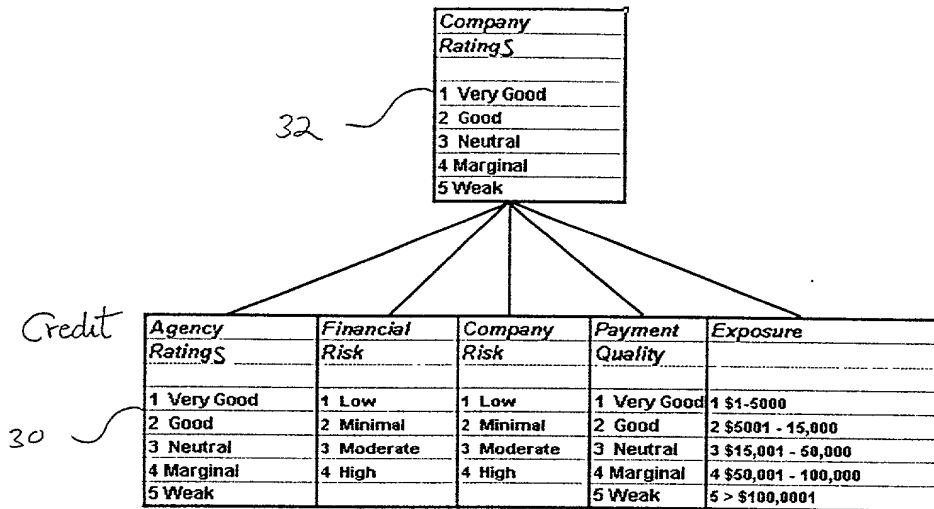


FIG. 3

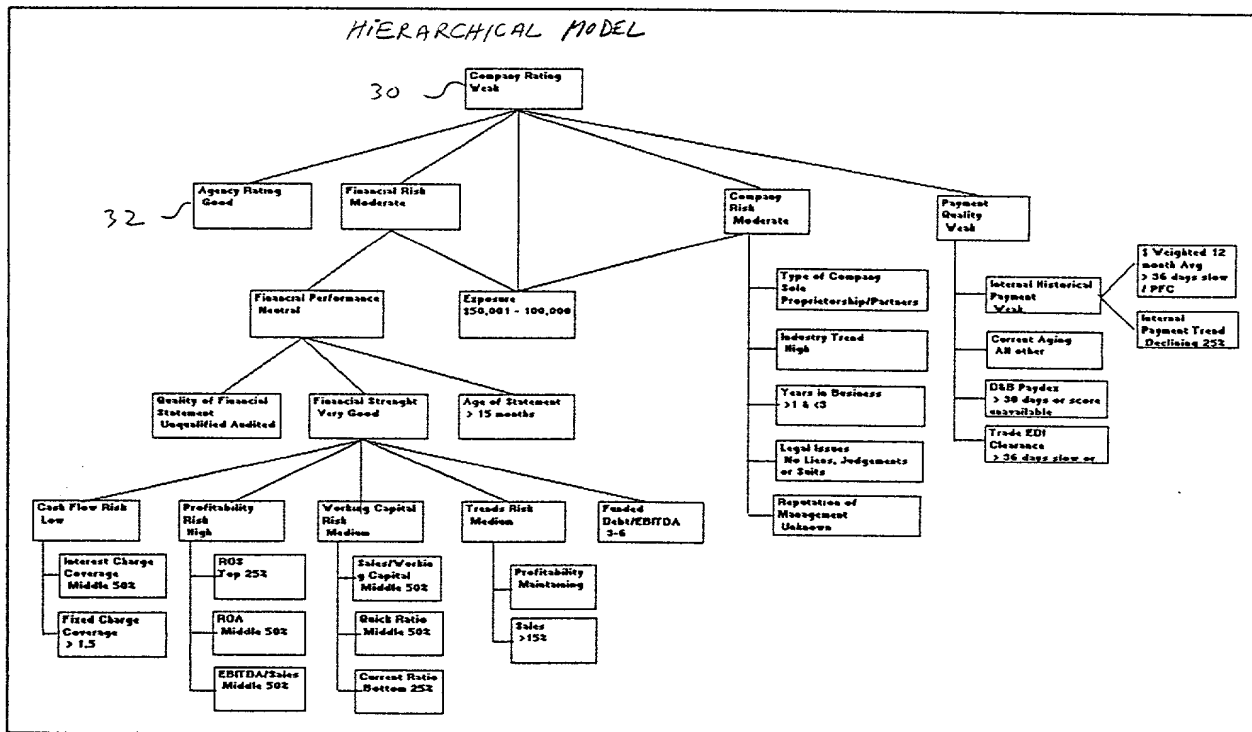


FIG. 4

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D&B Mapping of Raw Data (e.g., from D&B) for Credit Agency Ratings

1. Very Good	2. Good	3 Neutral	4 Marginal	5 Weak
5A1	3A2	5A3	BB3	5A4
5A2	2A1	4A3	CB3	4A4
4A1	2A2	3A3	CC3	3A4
4A2	1A1	2A3	DC3	2A4
3A1	1A2	1A3	DD2	1A4
	BA1	BA3	EE2	BA4
	BA2	DC2	FF2	BB4
	CB1	DD1	GG2	CB4
	CB2	EE1	HH2	CC4
	CC1	FF1	IR2	DC4
	DC1	GG1	IR2	DD3
		HH1	2R2	DD4
			NL	EE3
			--	EE4
			NQ	FF3
			ER1	FF4
			ER2	GG3
			ER3	GG4
			ER4	HH3
			ER5	HH4
			ER6	IR3
			ER7	IR4
			ER8	2R3
			ERN	2R4

FIG 5

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Payment Quality
1 Very Good
2 Good
3 Neutral
4 Marginal
5 Weak

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Internal Historical Payment	Current Aging	D&B Paydex relative to industry average	Trade EDI Clearance
1 Very Good	1 All other	1 < 10 days slower	1 < 10 days slow
2 Good	2 >25% >30 days p/d	2 11-30 days slower	2 10-20 days slow
3 Neutral	3 >10% >60 days p/d	3 > 30 days or score unavailable	3 21-30 days slow
4 Marginal			4 31-35 days slow
5 Weak			5 ≥ 36 days slow or PFC

FIG. 6

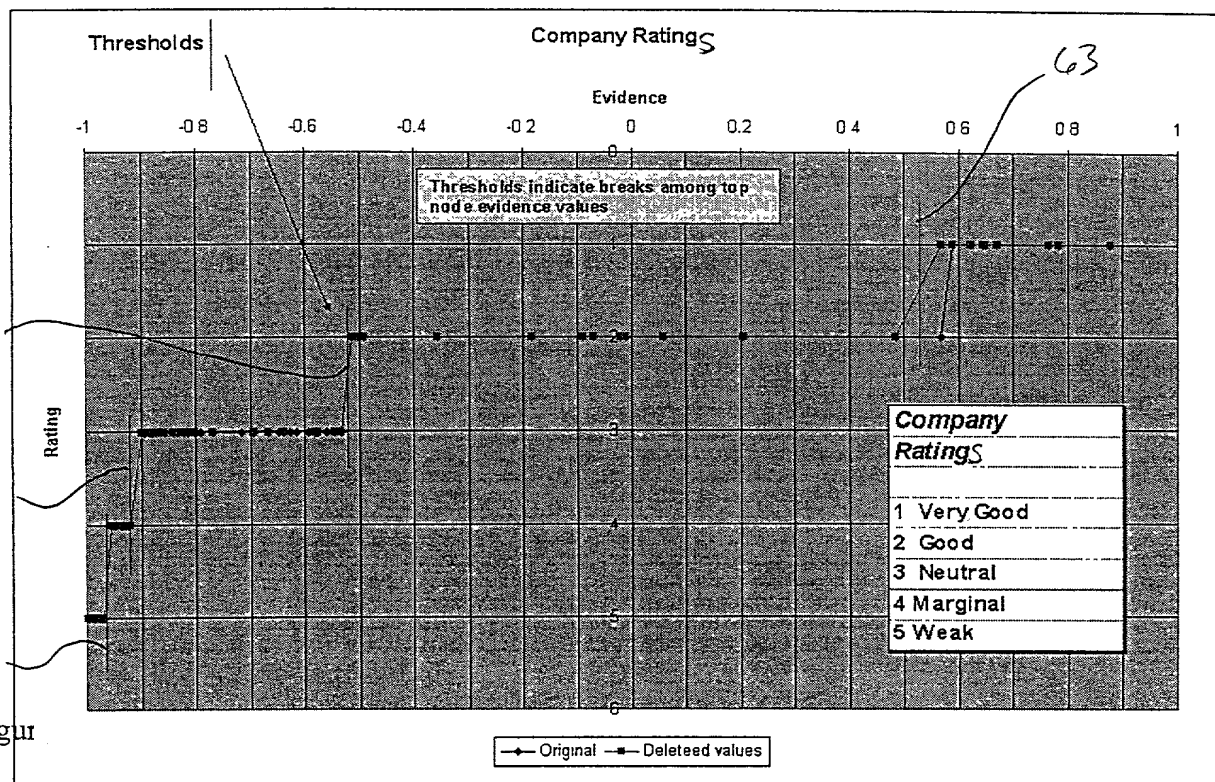


FIG. 7

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Company Rating

Agency Rating	Financial Risk	Company Risk	Payment Quality	Exposure	Company Rating
1 Very Good	1 Low	1 Low	1 Very Good	1 \$1-5000	1 Very Good
2 Good	2 Minimal	2 Minimal	2 Good	2 \$5001 - 15,000	2 Good
3 Neutral	3 Moderate	3 Moderate	3 Neutral	3 \$15,001 - 50,000	3 Neutral
4 Marginal	4 High	4 High	4 Marginal	4 \$50,001 - 100,000	4 Marginal
5 Weak			5 Weak	5 > \$100,000	5 Weak

Create a statistical sample of the possible hypothetical cases  
- Expert supplies his opinion or diagnosis

Used as input to machine learning technique

Case	Agency Rating	Financial Risk	Company Risk	Payment Quality	Exposure	Company Rating	Comment
604	2	3	1	1	4	1	Very Good
1821	5	3	1	5	1	1	Very Good
1567	4	4	3	4	2	2	Good
1712	5	2	1	3	3	3	Neutral
250	1	3	3	2	5	5	Weak
1952	5	4	3	1	2	2	Good
152	1	2	3	1	2	2	Good
631	2	3	4	4	1	1	Very Good
1653	5	1	3	2	4	4	Good
588	2	2	4	3	3	3	Neutral
1093	3	3	4	4	3	3	Neutral
132	1	2	2	2	2	2	Good
760	2	4	3	2	5	5	Weak
25	1	1	1	5	5	5	Weak
1281	4	2	4	2	1	1	Very Good
107	1	2	1	2	2	2	Good
1156	3	4	3	2	1	1	Very Good
1880	5	2	4	1	5	5	Weak
595	2	2	4	4	5	5	Weak
531	2	2	4	4	1	1	Very Good
142	1	2	2	4	2	2	Good
1924	5	4	1	5	4	4	Good
1764	4	2	3	3	4	4	Good
646	2	3	2	5	1	1	Very Good
1704	5	2	1	1	4	4	Good
1123	3	4	1	5	3	3	Neutral
212	1	4	1	3	2	2	Good
554	2	2	3	1	4	4	Good
83	1	1	3	4	4	4	Good
946	3	2	2	5	1	1	Very Good

FIG. 8

# Evidence Modeling

Evidence matrix associates an evidence value with each risk element value

## Company Rating

Agency Rating	Financial Risk	Company Risk	Payment Quality	Exposure
1 Very Good	1 Low	1 Low	1 Very Good	1 \$1-5000
2 Good	2 Minimal	2 Minimal	2 Good	2 \$5001 - 15,000
3 Neutral	3 Moderate	3 Moderate	3 Neutral	3 \$15,001 - 50,000
4 Marginal	4 High	4 High	4 Marginal	4 \$50,001 - 100,000
5 Weak			5 Weak	5 \$100,000+

Company Rating
1 Very Good
2 Good
3 Neutral
4 Marginal
5 Weak

0.151	0.574	0.025	0.847	0.354
0.001	-0.183	-0.051	0.847	0.021
-0.074	-0.784	-0.666	-0.059	0.021
-0.074	-0.846	-0.847	-0.478	-0.518
-0.564	0.000	0.081	-0.009	-0.518

Case	1	2	3	4	5
1001	1	1	1	1	1
1005	1	1	1	1	1
1031	1	1	1	1	1
1209	1	1	1	1	1
107	1	1	1	1	1
1632	1	1	1	1	1
132	1	1	1	1	1
507	1	1	1	1	1
412	1	1	1	1	1
410	1	1	1	1	1
55	1	1	1	1	1
600	1	1	1	1	1

Comments	CE Comp	Agency	Financial	Company	Payment	Exposure
	0.878	0.151	0.574	0.025	0.847	0.021

Cumulative evidence for an example defines goodness of top node

0.850	0.151	-0.183	0.025	0.847	0.021
0.544	-0.564	0.574	-0.051	0.847	0.021
0.522	0.151	-0.183	-0.051	0.847	0.021
0.588	0.001	-0.183	0.025	0.847	0.021
0.508	0.001	0.574	0.025	-0.059	0.021
0.400	0.001	0.574	0.025	-0.478	0.354
0.206	0.151	0.574	-0.666	0.847	-0.518
0.060	0.001	-0.784	0.025	0.847	0.354

## Evidence Combination Rules

$$e = e_1 + e_2 (1 - e_1) \quad \text{if } e_1 \geq 0 \text{ and } e_2 \geq 0$$

$$e = e_1 + e_2 (1 + e_1) \quad \text{if } e_1 < 0 \text{ and } e_2 < 0$$

$$e = 0 \quad \text{if } e_1, e_2 = -1$$

$$e = (e_1 + e_2) / [1 - \min(|e_1|, |e_2|)] \quad \text{Otherwise}$$

Evidence values range from 1 (good) to -1 (bad)

	1	2	3	4	5
MIN	0.5878	-0.5139	-0.8994	-0.9542	-0.9979
MAX	0.8780	0.5678	-0.5339	-0.9194	-0.9685
Thresholds	0.577781	-0.52391	-0.90942	-0.96137	
Separation	0.002	0.002	0.002	0.002	0.002
Total Separation					
Min Separation					
Std Dev					
Scale factor					
Merit					

Thresholds indicate breaks among top node evidence values

FIG. 9

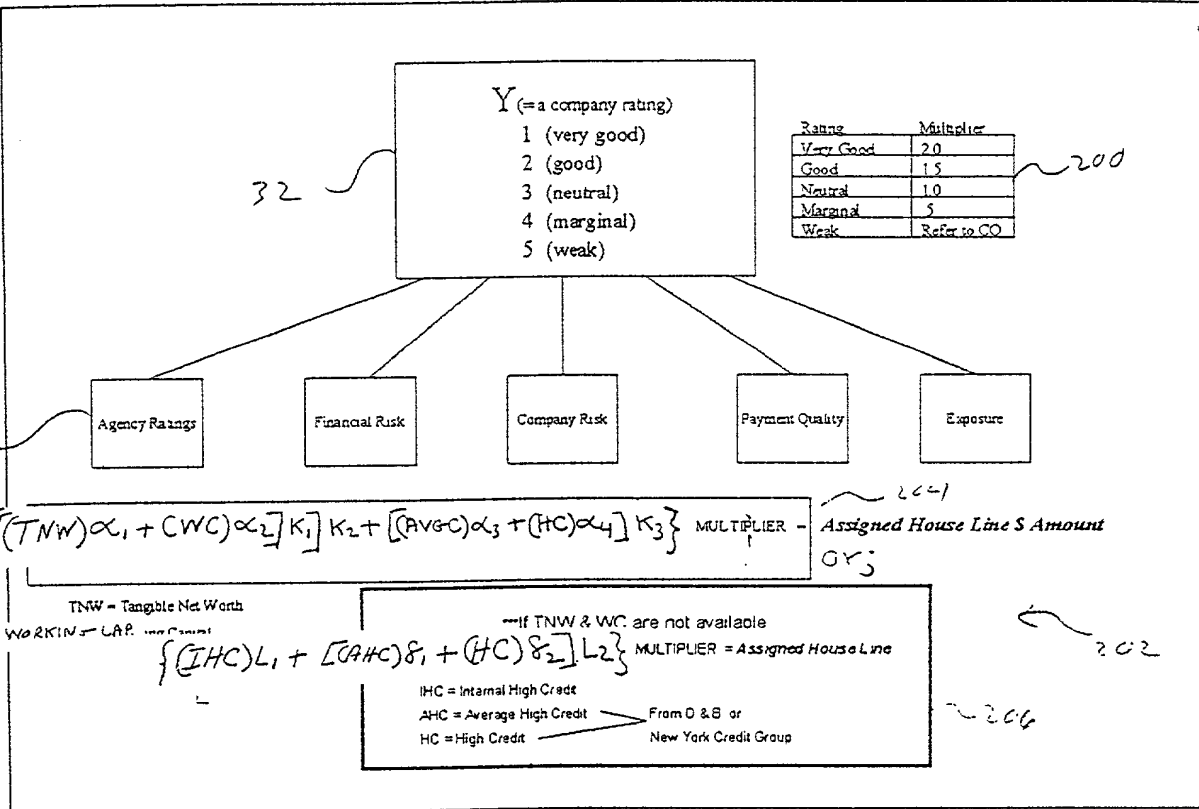


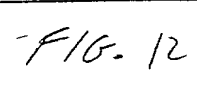
FIG. 10



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[illegible]

FIG. 11.



**Description: Test Case 4**

Inputs	
\$ Weighted 12 month Avg	2: 11:20 days slow
Internal Payment Trend	2: 24% to -24% (or Unknown)
Sales/Working Capital	2: Middle 50%
Quick Ratio	2: Middle 50%
Current Ratio	2: Middle 50%
Profitability	3: Down > 10%
Sales	4: Declining
ROS	3: Bottom 25%
ROA	3: Bottom 25%
EBITDA/Sales	3: Bottom 25%
Agency Rating	4: Marginal
Exposure	5: \$100,000
Type of Company	1: Type C
Industry Trend	1: Low
Years in Business	1: > 3
Legal Issues	1: No Liens, Judgements or Suits
Reputation of Management	3: Checkered
Quality of Financial Statement	1: Unqualified Audited
Age of Statement	1: < 6 months
Funded Debt/EBITDA	3: > 6 or < 0
Fixed Charge Coverage	1: > 1.5
Interest Charge Coverage	3: Bottom 25%
Current Aging	1: All other
D&B Paydex	2: 11:30 days slower (or Unknown)
Trade EDI Clearance	2: 10:20 days slow

**Run Model**

☒ Financials Known

☒ General Information Known

Outputs	
Company Rating	Marginal
Net Worth	\$0
Working Capital	\$0
Avg. High Credit	\$11,005
High Credit	\$200,000
Internal High Credit	\$150,000
Base Credit Line	\$108,852
Multiplier	0.5
House Line	\$54,000

FIG. 13

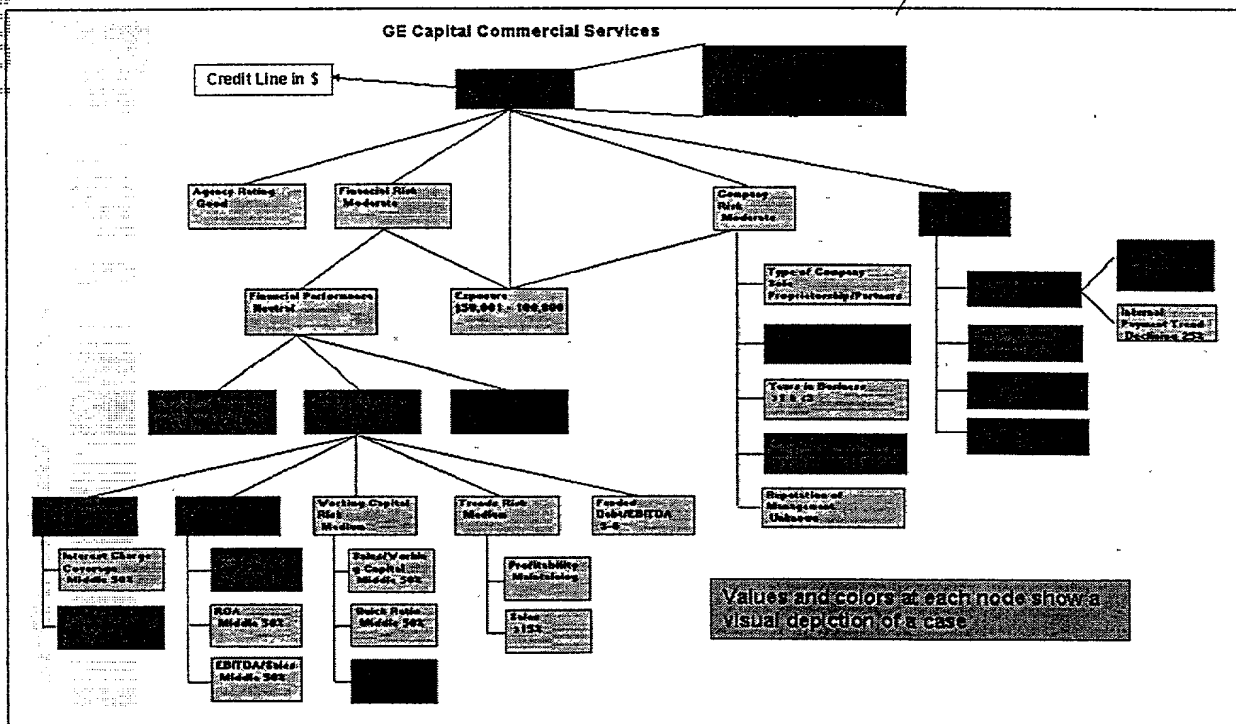


FIG. 14

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<b>GE Capital Commercial Service Test Case 4</b>			
House Line	\$54,000 00	The Financial Performance of:	Neutral
The Overall Company Rating of:	Marginal	Was based on:	
Was based on:		A Quality of Financial Statement of:	Unqualified Audited
An Agency Rating of:	Marginal	A Financial Strength of:	Very Good
A Financial Risk of:	High	An Age of Statement of:	> 15 months
An Exposure of:	> \$100,0001	The Financial Strength of:	Very Good
A Company Risk of:	Moderate	Was based on:	
A Payment Quality of:	Good	A Cash Flow Risk of:	Low
The Financial Risk of:	High	A Profitability Risk of:	High
Was based on:		A Working Capital Risk of:	Medium
A Financial Performance of:	Marginal	A Trends Risk of:	Medium
An Exposure of:	> \$100,0001	A Funded Debt/EBITA of:	3-6
The Company Risk of:	Moderate	The Cash Flow Risk of:	Low
Was based on:		Was based on:	
A Type of Company of:	Type C	An Interest Charge Coverage of:	Middle 50%
An Industry Trend of:	Low	A Fixed Charge Coverage of:	> 1.5
Years in Business of:	> 3	The Profitability Risk of:	High
Legal issues of:	No Liens, Judgements or Suits	Was based on:	
A Reputation of management of:	Checkered	A ROS of:	Top 25%
The Payment Quality of:	Good	A ROA of:	Middle 50%
Was based on:		An EBITA/Sales Ratio of:	Middle 50%
An Internal Historical Payment of:	Good	The Working Capital Risk of:	Medium
A Current Aging of:	All other	Was based on:	
A D&B Paydex of:	11-30 days slower (or Unknown)	A Sales/Working Capital Ratio of:	Middle 50%
A Trade EDI of:	10-20 days slow	A Quick ratio of:	Middle 50%
The Internal Historical Payment of:	Good	A Current Ratio of:	Bottom 25%
Was based on:		The Trends Risk of:	Medium
A Weighted Monthly Average of:	11-20 days slow	Was based on:	
A Payment Trend of:	24% to -24% (or Unknown)	A Profitability of:	Maintaining
		A Sales of:	>15%

FIG. 15